

**A critical appraisal of “Hydrotherapy Versus Conventional Land-Based Exercise for the Management of Patients with Osteoarthritis of the Knee: A Randomized Clinical Trial”.**

**By**

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## **Abstract**

Within this critical appraisal, the background information of a study regarding hydrotherapy versus land-based methods for management of osteoarthritis (OA) knee pain, the strengths and weaknesses of each section, and further discussion of the relevance and application of this study are all addressed.

The first section addressed in this appraisal is the methods that pertains to where and how the article was found, as well as why this article was chosen in order to address my specific clinical question. The appraisal then goes on to discuss both the strengths and weakness of each section presented in the article. Some of the biggest strengths include the fact that it was a controlled randomized test, there was one unbiased investigator performing evaluations, a detailed description of the intervention plan was provided, and all outcome measures were addressed. While there were not many large weaknesses to this study's article, some of the ones mentioned in this appraisal include the lack of data collection details and OA statistics or more detailed information, and the fact that participants knew their group placements.

The appraisal then goes on to discuss the importance of knowing the results of this study and how it addresses the presented clinical question, potential risks and benefits of implementation, and why I, as a student physical therapist, would consider implementing such techniques in my future care of OA patients.

## **Key words**

Hydrotherapy, Land-Based Therapy, Osteoarthritis

## **Introduction**

With the reality of longevity in today's world and number of individuals reaching increasingly older ages, osteoarthritis (OA) will become even more prevalent. There are over 30 million Americans affected by this joint disorder, and it is also considered "the most common form of arthritis"<sup>1</sup>. There are both modifiable and non-modifiable risk factors associated with the development of OA, and because this, both education and beneficial intervention methods are critical in the treatment of those diagnosed. The clinical question that led me to finding this article was whether hydrotherapy or traditional land-based strength and aerobic exercises were more effective for pain management in those diagnosed with osteoarthritis. The purpose of this critical appraisal is to determine the quality of this study article, and whether or not the strategies mentioned are safe, effective, and reliable.

## **Methods**

While searching for an article, I used the following databases: ASU Library Catalog, Google Scholar, and PubMed. The keywords used to find articles related to my proposed question were "hydrotherapy" and "osteoarthritis pain". In order to reduce the number of hits to articles most relevant to me, I limited the search to those with full free access to the article and those which were published after the year 2000. I placed these limits to assure that I would have access to the articles that I was interested in reading, as well as placing the time limit so as to see recent and semi-recent studies on my proposed topic. I did set one exclusion criteria in place, and that was to exclude articles not written in English, and this was because English is my prominent language, and what I best understand. With these constraints, I had about 70 hits before beginning to review articles.

The article of this critical appraisal was published in volume 88 of the “Physical Therapy” journal in 2008. The authors of this study are Luciana E. Silva, Valeria Valim, Ana Paula C. Pessanha, Leda M. Oliveira, Samira Myamoto, Anamaria Jones, and Jamil Natour. This study was conducted at the Federal University of São Paulo in São Paulo, Brazil. The subjects of this study were chosen based on their attendance at the Rheumatology Outpatient Clinics at São Paulo Hospital, so all recruitment and interventions took place in the same geographic location. I chose to critically appraise this article not only because I find the topic interesting, but because I found it to be very well written and wanted to dive deeper into the details of this specific study.

## **Results**

### Summary of the study

The purpose of this study was to gain knowledge on whether land-based or hydrotherapy is more beneficial in treating knee osteoarthritis through a randomized clinical trial. There were 64 participants recruited from a Rheumatology Outpatient Clinic who had to have been diagnosed with knee OA and be experiencing pain within a specified range. There were also multiple exclusion factors, including conditions such as symptomatic lung disease or a psychiatric disorder. Patients were randomly placed in one of the two intervention groups, and there was one blinded investigator who performed all evaluations before interventions, and again at weeks nine and eighteen. There were different methods used to measure function, pain, and gait for the participants, as well as NSAID use. The interventions were led by two PTs, and while the same exercises were used with both treatment groups, they were modified for hydrotherapy so that the same muscle groups were being targeted. The results of this study showed that there was a reduction in pain and improved physical performance within both groups, with the hydrotherapy group having more pain reduction. At the conclusion of the study, the researchers

found that both treatments are effective, and that hydrotherapy may even be the better treatment choice for knee OA patients.

### Appraisal of the study introduction

The authors did a great job of providing a sufficient amount of background information in the introduction section that made the topic easy to understand for the reader. There were good descriptions of osteoarthritis (OA) and some symptoms associated with this joint disorder were mentioned. The authors also related topics and results of previous studies with similar goals to what they were planning to do, as well as providing the specific aim of this study. The authors successfully used literature when forming a rationale for the necessity of the study, and cited multiple articles from credible sources regarding osteoarthritis and previous studies on the topic. Additionally, the author's expressed the critical variables of this article very well and not only described osteoarthritis and how it affects those diagnosed, but it also describes the two methods of intervention that will be used in this study. Overall, the introduction is very clear and well written, as you can tell the aim of the study and have a good base of knowledge for what they are planning to do in the study.

While I do not believe there are any detrimental weaknesses to the introduction of this article, there are some aspects of the study that could have been added to improve the quality. I would have liked to see some statistics included regarding the prevalence of OA and OA of the knee, the specific individuals who were most affected, as well as some specifics of the studies that were referenced and details of treatments they implemented. I also believe that including social and economic implications of those with OA would have been beneficial. The only other aspect that was absent in this section is the conclusion from the literature review, which isn't explicitly stated.

### Appraisal of the study methods

After reviewing the methods section, there were many strengths to this particular study. One of the biggest strengths is the fact that there was one investigator who performed all evaluations, such as pain, function and gait, and did not know the subject's placement, therefore eliminating bias. Another strength is that the number of participants and similar severity of OA in each group were very similar, allowing for a good comparison capability. Subjects were placed randomly into each treatment group by drawing lots, and by doing this, bias was once again eliminated. As stated earlier, there were specific inclusion requirements, as well as exclusion factors to ensure that the two groups would be as similar as possible to accurately gauge the outcomes due each intervention. Both groups were instructed by the same two physical therapists, so there was no difference in treatment between groups. The authors provided a very specific intervention plan for each treatment group, and did it in a way that can easily be replicated. I believe the outcome measurements were described very well, as it gave a description of what it was testing for, the score ranges, and what higher scores meant. Each outcome measurement mentioned was also said to be valid, reliable, and responsive to what they were testing. All claims were supported by a citation, and while all were pre-2000 sources, they were published in reliable journals.

As well written as this section was, there are two noticeable weaknesses. One weakness is that the participants and physical therapists were not blind to the group placements, and this fact can have an impact on the results, even if it is unintentional bias. The other weakness is the lack of specific information provided regarding the collection of data on dependent variables. This information is necessary for the replication of this study, as well as interpreting whether they performed the optimal data collection methods.

### Appraisal of the study results

The results section flowed very well, and it was easy to decipher information between the two groups. The author describes and addresses the results of each questions presented earlier in the article, and provided one paragraph per research aspect and spoke of how each group was affected, while also presenting organized and appropriate tables and graphs to further divulge results. The authors addressed all outcome measures mentioned in the methods section, and provided results. P-values and confidence intervals were also provided in this section and in the graphs so as to identify the statistically significant results.

The only weakness present in this section was the lack of a specifically stated p-value parameter, leaving the reader to infer its value based on other information provided in the text and tables.

### Appraisal of the study discussion

Within the discussion section, the authors spoke of how each outcome measure is affected by those with knee OA, the importance of these factors when treating OA, and further discussed the results and their relevance. There were references to existing literature on the topic published in credible journals, and the authors compared their outcomes to those of these other studies. Another strength of this section was the fact that the limitations of the study were addressed, proving that the authors acknowledge ways to better future studies on this topic. The authors also addressed the importance of their results and what they mean for implementing treatments, as well as addressing the clinical significance of the study and how it can benefit patients.

There does not appear to be any weaknesses in this section other than the fact that some of the sources cited were secondary sources instead of primary sources, and some were a little old.

## **Discussion**

The results of this study are very important to PT practice because it shows a viable variation from normal intervention methods, that have proven to be more beneficial in the reduction of certain outcome measures. While not every clinic has access to a pool to perform hydrotherapy, those that do may have a better treatment plan for patients who are still experiencing OA knee pain after traditional land-based techniques or have other physical demands that must be taken into consideration. This study is very relevant to my clinical question because it is addressing and testing the specific components I asked about, and comparing their outcomes.

Based on the information provided within the article and the credibility of sources referenced, I believe using the hydrotherapy intervention presented would be beneficial to patients with knee osteoarthritis pain. The potential benefits of hydrotherapy as compared to traditional intervention practices include increased functional abilities, decreased pain both before and after walking, and greater adherence to treatment. The potential risks of this treatment can include injury due to being in the water, such as drowning or infection. In my opinion, the benefits outweigh the risks, because of the presence of the therapist for safety and the cleaning standards of most clinics and facilities reduce the possible risks. One thing that could improve the argument in favor of using this intervention would be long term results of hydrotherapy versus land-based therapy, in order to truly be confident in the decision of which method to implement.



There is enough research validity present in this article that I would feel confident considering using these methods in my future patient care. In this study and those referenced by the authors, hydrotherapy either worked as effectively or better than traditional methods, so I believe that it would be a viable alternative method to try for those patients who aren't experiencing much relief from the latter. I also anticipate that I would be able to implement this intervention safely and effectively in the future, given the skills and knowledge I will have as a therapist as well as the detailed description of the proposed intervention.

The purpose, strengths and weaknesses, and application ability have all been addressed in this critical appraisal, and through all interpretations, I do believe that this is study that is both trustworthy and valid. Osteoarthritis is a very prevalent health issue in today's world, and as such, it is imperative to continue research on the maintenance and reduction of symptoms affiliated with this disease. The future studies on the topic will also require critical appraisals, but in doing so, more knowledge regarding OA that has been reviewed will be disseminated to benefit patients.

## References

1. Arthritis. *Centers for Disease Control and Prevention*.

<https://www.cdc.gov/arthritis/basics/osteoarthritis.htm>. Published July 6, 2017. Accessed November 8, 2017.